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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/852,158	05/06/1997	SHARAD MATHUR	MSI-151US	6705
22801	7590	07/06/2004	EXAMINER	
LEE & HAYES PLLC 421 W RIVERSIDE AVENUE SUITE 500 SPOKANE, WA 99201			LAO, SUE X	
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			2126	

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

08/852,158

Applicant(s)

MATHUR ET AL.

Examiner

S. Lao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-53 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 20, 21, 31 and 51-53 is/are allowed.
- 6) ☒ Claim(s) 1-19, 22-30 and 32-50 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. Claims 1-53 are pending. This action is in response to the amendment filed 3/30/2004. Applicant has amended claims 21 and 31 and added claims 51-53.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-6, 8-13, 15, 32, 33, 35-37, 39, 41-46, 48, 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inside Macintosh (QuickDraw GX Environment and Utilities, chapters 2 and 3) (hereafter IM) in view of Gien et al ("Micro-kernel Based Operating Systems: Moving UNIX onto Modern System Architectures").

As to claim 1, IM teaches a method of controlling memory usage in a computer system having limited physical memory, wherein one or more application programs (application) execute in conjunction with an operating environment (mac OS and QuickDraw GX on which 'your application' runs), the method comprising:

setting a plurality of memory thresholds (thresholds for warning / graphics\_client\_memory\_too\_small, non-fatal errors/could\_not\_dispose\_backing\_store, fatal errors / out\_of\_memory); and

the operating environment wielding, at increasingly critical memory thresholds (from warning to non-fatal errors to fatal errors), correspondingly increasing control over said one or more application programs to reduce memory usage (from continue execution to continue execution internally to terminate execution immediately). See pages 3-3; 3-7; 3-11; 3-41; 3-42; 3-45.

While the IM operating environment (mac OS and QuickDraw GX on which 'your application' runs) provides 'your application' with memory/resource management services (discussed above), IM does not teach that such memory/resource management services are provided in the operating system mode, ie, in the system space.

Gien teaches operating system architectures, wherein a resource management service (file manager) can be implemented either in the system mode / system space, or in the application mode / user space. See page 7, last para. - page 8, last para., fig. 4. Therefore, it would have been obvious to implement the memory/resource management services of the IM operating environment in the operating system level / kernel mode. One of ordinary skill in the art would have been motivated to combine the teachings of IM and Gien because this would have enhanced system portability and efficiency (Gien, page 7, last paragraph).

As to claim 2, IM teaches at a less critical memory threshold (non-fatal internal errors), communicating a quest (post warning) to at least one of the application programs for the at least one application program to limit its use of memory (6 steps); and at a more critical memory threshold (truly fatal error), terminating at least one of the application programs without allowing its further execution (terminate execution immediately). See page 3-41; 2-11; 2-12.

As to claim 9, storing the instructions on a computer-readable storage medium would have been obvious.

As to claim 32, IM teaches a method of controlling memory usage (memory management) in a computer system having limited physical memory, wherein one or more application programs (applications) execute in conjunction with an operating environment (mac OS and QuickDraw GX on which 'your application' runs), the method comprising:

- monitoring memory usage (detect); and

- when memory usage is high (memory problem), sending a message (warnings, notices, errors) from the operating system to at least one of the application programs requesting the application program to reduce its current use of memory (invoke application's handlers to process warnings, notices, errors). Page 3-3. Note discussion of claim 1 for implementing the memory/resource management services at the operating system level.

As to claim 33, IM teaches sending the message to the application program when memory usage reaches a defined threshold (warning /

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graphics\_client\_memory\_too\_small, non-fatal errors / could\_not\_dispose \_backing\_store, fatal errors / out\_of\_memory). Note discussion of claim 1 for implementing the memory/resource management services at the operating system level.

As to claim 36, storing instructions for performing the method recited on a computer-readable storage medium would have been obvious.

As to claim 37, note discussion of claim 33.

As to claims 3, 4, IM shuts down an application when the application poses severe enough memory problem. Page 3-41. It is well known that shutting down an application can be a graceful shut down or a forced shut down, wherein the former properly saves the states/data before exiting, and the latter may result in data loss. Requesting the at least one selected application program close itself is taught by a graceful shut down, and terminating the application without allowing its further execution is taught by a forced shut down. As to prompting a user to select an application, it is met by IM (let the user know) page 3-41.

As to claims 5, 6, IM teaches at a first memory threshold, requesting at least one of the application programs to limit its use of memory (warning), at a second memory threshold, requesting at least one of the application programs to close itself (GXExitGraphics ()), at a third memory threshold, terminating at least one of the application programs without allowing its further execution (terminate execution immediately). See pages 3-3; 3-7; 3-11; 3-41; 3-42; 3-45; 2-10, 2-21. As to prompting a user to select an application program, it is met by IM (let the user know, page 3-41; you/user frees memory before GX does it, page 2-12).

As to claim 8, IM teaches discarding read-only memory (unload objects in pictures, page 2-11).

As to claim 10, it is covered by claims 1, 3 and 4. Note claims 1, 3 and 4 for discussion.

As to claims 11, 12, note claims 5 and 6 for discussion of prompting a user before requesting. IM further teaches requiring a user's action before system action

(you/user frees memory before GX does it, page 2-12) and thus it would have been obvious to require a user to select/direct before closing/terminating.

As to claim 13, it is covered by claim 5. Note claim 5 for discussion.

As to claim 15, note discussion of claims 3, 4 and 8.

As to claims 35, 39, reclaiming memory from a least recently used application is a well known algorithm (LRS). It would have been obvious to use LRS algorithm in IM.

As to claim 41, it is covered by claim 1 and first requesting step of claim 5. Note claim 1 and first requesting step of claim 5 for discussion.

As to claims 42-46 and 48, note claims 2-6 and 8, respectively, for discussions.

As to claim 50, note discussions of claims 32 and 35.

4. Claims 7, 14, 16-19, 22, 47, 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inside Macintosh in view of Gien as applied to claims 1, 10 in view of Lindholm et al (U. S. Pat. 5,765,157).

As to claim 7, Lindholm teaches memory management, including at a memory threshold, reclaiming unused stack memory (deallocate memory area of ANC stack that is no longer needed). Col. 8, lines 6-22. Therefore, it would have been obvious to reclaim unused stack memory in IM. In so doing, the average run-time storage cost to support a program is reduced. (Lindholm, col. 2, lines 42-62).

As to claim 14, note discussion of claims 3, 4 and 7.

As to claim 16, note discussion of claims 14 and 15.

As to claim 17, it is covered by claims 5 and 16. Note claims 5 and 16 for discussion.

As to claims 18 and 19, the relation to the second and third, and the relation to the first, second and third are covered by claim 17 as before the second and the third.

As to claim 22, storing the instructions on a computer-readable storage medium would have been obvious.

As to claim 47, 49, note claims 7 and 17, respectively, for discussions.

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5. Claims 23-28, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inside Macintosh in view of Gien as applied to claims 1, 32, 37 in view of Culbert et al (U. S. Pat. 5,696,926).

As to claim 23, IM teaches a computer system comprising: a processor (inherent); an operating environment (mac OS and QuickDraw GX on which 'your application' runs) that is executable by the processor and that utilizes the physical memory (inherent); a virtual memory system (heaps) that includes physical memory; one or more application programs (application) that utilize the virtual memory system; wherein the operating environment is configured to perform the following acts: monitoring physical memory usage (detect); and at increasingly critical physical memory usage thresholds (for warning / `graphics_client_memory_too_small`, non-fatal errors / `could_not_dispose_backing_store`, fatal errors / `out_of_memory`), wielding increasing control over said one or more application programs to reduce physical memory usage (from continue execution to continue execution internally to terminate execution immediately). See pages 3-3; 3-7; 3-11; 3-41; 3-42; 3-45. Note discussion of claim 1 for implementing the memory/resource management services at the operating system level.

IM does not teach that the system does not include secondary storage.

Culbert teaches that an operating environment such as Mac operating system with QuickDraw graphical functionality (col. 7, lines 18-31) is implemented on a computer system wherein a secondary storage is optional (col. 4, lines 56-67). Given the teaching of Culbert, it would have been obvious not to use a secondary storage with IM. In so doing, the system would have been more compact.

As to claims 24-28, 30, note discussions of claims 2-6, 8, respectively.

6. Claims 34, 38, 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inside Macintosh in view of Gien as applied to claims 32, 37 in view of Berstis et al (U. S. Pat. 5,909,215).

As to claims 34, 38, Berstis teaches error handling, wherein application programs have respective message loops, error handling includes sending an error message to

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an application program through its message loop (col. 6, lines 33-54, fig. 4). Therefore, it would have been obvious to send the message to the application program through its message loop in IM. A motivation to combine the teachings of IM and Berstis includes providing to the user with a useful error message indicating required corrective action(s) (Berstis, col. 1, lines 51-60, col. 2, lines 6-21).

As to claim 40, IM as modified teaches an application program (IM, application) that resides in a computer-readable memory for execution by a processor in conjunction with an operating environment (IM, mac OS and QuickDraw GX on which 'your application' runs), the application program having a message loop (Berstis, fig. 4) that receives messages (messages, including error messages) from an operating environment (Berstis, col. 6, lines 33-54). Note discussion of claim 1 for implementing the memory/resource management services at the operating system level.

IM further teaches the application program is responsive to a particular message (GXExitGraphics(void)) received to reduce its current use of memory (exit disposes all the application's graphical clients and their heaps) (page 2-10). When the teachings of IM and Berstis are combined, such message would have been received through the application's message loop.

7. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inside Macintosh in view of Gien et al and Culbert et al as applied to claim 23 and further in view of Lindholm et al.

As to claim 29, note discussion of claim 7.

8. Claims 20, 21, 31 and 51-53 are allowed.

9. Applicant's arguments filed 3/30/2004 have been fully considered but they are not persuasive.

Applicant argued that it is not clear whether QuickDraw GX is an operating system or software on which an application runs. (remarks, page 26, 2<sup>nd</sup> and last paragraphs).

The examiner's response is that QuickDraw GX is a well known development and execution environment on which graphics applications are developed and run. Most QuickDraw GX functions are designed for implementation on any platform, although there are specific functions that are wrappers for Macintosh system software functions or have meaning only in the Macintosh environment. Extensive documentation can be found at ["http://developer.apple.com/documentation/mac/Legacy/GXEnvironment/GXEnvironment-2.html"](http://developer.apple.com/documentation/mac/Legacy/GXEnvironment/GXEnvironment-2.html). Further in chapter 2 of "QuickDraw GX Environment and Utilities", pages 2-3 to 2-4 and throughout the chapters 2 and 3, IM explicitly states that an application program running under QuickDraw GX Environment is "your application". In the same manner that an application developed and run under VB environment is called an VB application in the art, or similarly a Java application, an application developed and run under QuickDraw GX environment is called a QuickDraw GX application (your application). QuickDraw GX environment's memory management portion manages memory blocks used by "your application". Page 2-3, 1<sup>st</sup> paragraph. Therefore, error messages is displayed to "your application" by the QuickDraw GX environment. In other words, an application developed and run under QuickDraw GX environment is closely related to, but different from, the QuickDraw GX environment.

Applicant argued that IM and Gien cannot be combined because Gien teaches away from shoe-horning features. (remarks, pages 27-28). The examiner respectfully disagrees. The passage (page 1, last paragraph) cited by applicant containing shoe-horn is in the section where Gien discusses the background/prior which leads to his invention, rather than with respect to QuickDraw GX environment. Applicant has not provided evidence from Gien showing that the teaching relied on, ie, a resource management service (file manager) can be implemented either in the system mode / system space, or in the application mode / user space (see rejection of claim 1), nor the QuickDraw GX environment, is the "shoe-horn" discussed in Gien. Therefore, Gien does not teach away the combination.

Regarding applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning (remarks, pages 28-29), it must be

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recognized that any judgement on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. In re McLaughlin, 443 F.2d 1392; 170 USPQ 209 (CCPA 1971). In this case, the office action relied on the teachings of IM and Gien in the rejection. See sections 3-7.

Regarding applicant's argument against the combination because Gien is explicitly directed to multiprocessor computers in a UNIX operating system environment (remarks, page 30), the examiner's response is that it is the teachings of IM and Gien, instead of the respective physical elements, nor the respective environments where the teachings are applied, that are combined. The test for obviousness is not whether the features of one reference may be bodily incorporated into the other reference to produce the claimed subject matter but simply what the references make obvious to one of ordinary skill in the art. Gien teaches a resource management service (such as a file manager) can be implemented either in the system mode / system space, or in the application mode / user space. It is this concept that is applied to IM.

Applicant argued that IM does not teach claim 1 because QuickDraw GX environment is not an operating system and cited applicant's disclosure examples of operating systems, in particular, Windows CE, and Microsoft Dictionary for support. (remarks, pages 30-33). The examiner's response is that while Windows CE, along with other operating systems are disclosed, they are not recited in the claims. During examination, the claims are interpreted in light of applicant's specification, but the specification is not read into the claims. The Microsoft Dictionary is not part of applicant's disclosure. Further, Gien teaches resource management service (such as a file manager) can be implemented either in the system mode / system space, or in the application mode / user space. Therefore, it would be obvious to implement the memory/resource management services of the QuickDraw GX operating environment in the operating system level / kernel mode. It is the combination of IM and Gien that meets claim 1.

Regarding the argued rejection of claims 3 and 4 (remarks, pages 33-36), the passage showing IM shuts down an application when the application poses severe enough memory problem is in Page 3-41. The out-of-memory error is a fatal error which leads to shut down of application, by stopping the application (page 3-41, 3<sup>rd</sup> paragraph) / terminating and exiting the application (page 3-7, 1<sup>st</sup> paragraph, which discusses the out-of-memory in detail). The argued requesting an application to close itself is met by the system/environment function GXExitGraphics () and 'let the user know', page 3-41; 'you/user frees memory before GX does it', page 2-12, as discussed in detail with respect to claims 5 and 6.

Regarding claim 32, the argued (remarks, pages 36-37) sending a message is met by IM and Gien, as discussed in detail in the rejection of claim 32: "IM teaches ... when memory usage is high (memory problem), sending a message (warnings, notices, errors) from the operating system to at least one of the application programs requesting the application program to reduce its current use of memory (invoke application's handlers to process warnings, notices, errors). Page 3-3. Note discussion of claim 1 for implementing the memory/resource management services at the operating system level."

Regarding claims 37, 50 (remarks, pages 37, 38, 39), sending a message from OS to application is met by IM and Gien as shown in the rejection of claim 37/33: "IM teaches sending the message to the application program when memory usage reaches a defined threshold (warning / graphics\_client\_memory\_too\_small, non-fatal errors/could\_not\_dispose \_backing\_store, fatal errors / out\_of\_memory). Note discussion of claim 1 for implementing the memory/resource management services at the operating system level.". It is noted that the operating system function is the memory management functions (IM) implemented at the system level (Gien) and the application is a application developed and run under QuickDraw GX environment, ie, a QuickDraw GX application.

Regarding claim 41 (remarks, page 37-38), the argued operating system is met by the combination of IM (memory management functions) and Gien (implement memory management functions at the system level), and the argued plurality of memory

threshold is met by IM as discussed in the rejection of claim 41 (referring to detailed discussions of claims 1 and 5).


Regarding the argued memory threshold in Lindholm (remarks, pages 42-43), it is met by the amount exceeding that is needed. The memory threshold is also met by IM, as discussed with respect to claim 1.

Regarding the argued physical memory, increasingly critical physical memory (remarks, page 45), these are met by IM as shown in the rejection of claim 23 "As to claim 23, IM teaches a computer system comprising: a processor (inherent); an operating environment (mac OS and QuickDraw GX on which 'your application' runs) that is executable by the processor and that utilizes the physical memory (inherent); a virtual memory system (heaps) that includes physical memory; one or more application programs (application) that utilize the virtual memory system; wherein the operating environment is configured to perform the following acts: monitoring physical memory usage (detect); and at increasingly critical physical memory usage thresholds (for warning / `graphics_client_memory_too_small`, non-fatal errors / `could_not_dispose_backing_store`, fatal errors / `out_of_memory`), wielding increasing control over said one or more application programs to reduce physical memory usage (from continue execution to continue execution internally to terminate execution immediately). See pages 3-3; 3-7; 3-11; 3-41; 3-42; 3-45. Note discussion of claim 1 for implementing the memory/resource management services at the operating system level.". As to the argument that Culbert does not characterize QuickDraw as an operating system, Culbert is not relied on to teach that QuickDraw is an operating system, rather, Culbert is recited to teach optional secondary storage, as shown in the rejection of claim 23: "Culbert teaches that an operating environment such as Mac operating system with QuickDraw graphical functionality (col. 7, lines 18-31) is implemented on a computer system wherein a secondary storage is optional (col. 4, lines 56-67). Given the teaching of Culbert, it would have been obvious not to use a secondary storage with IM.". It is noted that it is the combination of IM and Gien that provide the memory management functions at the system level.

Regarding the argument that the error messages of Berstis are not directed to memory (remarks, pages 48-49), the examiner's response is that error messages being directed to memory management is taught by IM (chapter 3, fatal, internal, recoverable errors). The combination of IM, Gien and Berstis would provides processing of error messages, including memory management error messages because memory errors are typical run time errors.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sue Lao whose telephone number is (703) 305-9657. A voice mail service is also available at this number. The examiner's supervisor, SPE Meng-Ai An, can be reached on (703) 305 9678. The examiner can normally be reached on Monday - Friday, from 9AM to 5PM. The fax phone number for the organization where this application or proceeding is assigned is (703) 872 9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-9600.

Sue Lao   
June 23, 2004